Opportunities in **Information Technology**

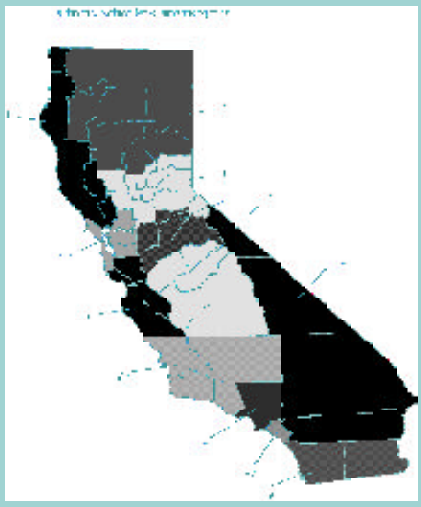
They used to call us nerds . . .

Now they call us very wealthy nerds.

Well. . . many of us.

We are the vanguard. More than any other group, we will decide how you will live tomorrow, and tomorrow, and tomorrow. Consider the changes in your life over the past ten years: how you (or your parents) work, bank, shop, travel, get health care, have fun, communicate with friends, get information, learn new things. We have transformed every one of these areas.

Bureau of Business Development



About this Publication: This is one of a series of publications developed to aid students and their guidance counselors with career decisions. The current series explores five industries: Health Services; Arts, Media, and Entertainment; Hospitality, Tourism, and Recreation; Information Technology; and Manufacturing.

The series is developed by the Employment Development Department's (EDD) Labor Market Information Division (LMID) California Cooperative Occupational Information System (CCOIS) for California's School-to-Career (STC) system.

The California STC Interagency Partners are: the California Department of Education, the Chancellor's Office of California Community Colleges, and the Employment Development Department.

For each industry, there is a statewide report and a report for each of the twelve California School-to-Career regions in order to provide information unique to the different areas. The twelve STC regions are:

Region 1:	Del Norte, Humboldt, Lake, Mendocino, and Sonoma Counties
Region 2:	Butte, Glenn, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, and Trinity Counties
Region 3:	Alpine, Colusa, El Dorado, Nevada, Placer, Sacramento, Sierra, Sutter, Yolo, and Yuba Counties
Region 4:	Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Solano Counties
Region 5:	Monterey, San Benito, Santa Clara, and Santa Cruz Counties
Region 6:	Amador, Calaveras, San Joaquin, Stanislaus, and Tuolumne Counties
Region 7:	Fresno, Kings, Madera, Mariposa, Merced, and Tulare Counties
Region 8A:	Los Angeles County
Region 8B:	Kern, San Luis Obispo, Santa Barbara, and Ventura Counties
Region 9A:	Imperial and San Diego Counties
Region 9B:	Orange County
Region 10:	Inyo, Mono, Riverside, and San Bernardino Counties

For more information on the California Career Opportunities publications, call (916) 262-2162.

Statewide

Opportunities in Information Technology

Fascinating, isn't it, to think that different combinations of 1s and 0s can do so many things? And you ain't seen nothin' yet!

We program the software that drives the world's activity. We design the links that speed information from one end of the globe to the other. We limit access and allow access, depending on your needs. We integrate databases into lightning fast information systems. And we make them look good in the process. We come up with some pretty neat games. And our graphics capabilities knock the socks off the motion picture business and virtually every other graphics medium around. Why, if Van Gogh were still around today. . .

And we're there to fix things when the 1s and 0s start to rebel.

And we WILL be there tomorrow!

Unless something like Y2K makes fools of us all and knocks us back into the stone age. . .

There's a third of a million of us dazzling California right now (not counting those who are manufacturing the technology we're designing and managing). We're growing faster than any other industry, expected to reach a half million within ten years. Demand for good people far exceeds supply in our industry and basic economics tells us what that does to salaries.

Workplace Size & Expected Growth

In California	*Employees*	*% of Total*	*% Growth Next 10 Years*
Total Information Technology Workforce	246,950	100	57
Computer Programming	43,098	17	81
Prepackaged Software	37,267	15	76
Computer Systems Design	21,286	9	99
Computer Facilities Management	1,529	1	86
Computer Rental & Leasing	874	<1	40
Other Computer Services	21,349	9	94
Computer & Data Processing	16,720	7	47
Information Retrieval	4,890	2	189
Telephone Communications	96,353	39	17
Telegraph & Other Non-Vocal Communications	947	<1	-16
Other Communications Services	2,637	1	25

See the Employment Development Department's Labor Market Information Web site www.calmis.ca.gov for more information.

So you think you might want to join us. . .

We can offer a lot of excitement, IF!!! If you're fascinated by the kinds of things that fascinate us, if you get excited about taking a bunch of abstract symbols and making them sing, literally and figuratively. So, your first job is to identify what kinds of things excite you, what kinds of things you're good at, what kinds of things you're praised for. What kinds of things you'd do even if no one in the world praised you for them.

The best way to consider a possible future in information technology is to use **our** technology to study our jobs. Go to your computer. Play with the software. Make it work. Is it fun? Or frustrating? Do you like the challenge? Study its manuals. Think you can do it better?

Go to **our** Internet. Investigate our jobs. Does the information give a good picture? Does it help you learn well? Could you do better? Play with the graphics capabilities. This is what you'll be doing during one of our days. Unraveling the mysteries of 1s and 0s. Solving its puzzles.

After that you can think about the secondary things:

What are the working conditions?

Are the settings comfortable?

Are the hours regular? Is that important?

What's the pay range? (All over the place, and growing)

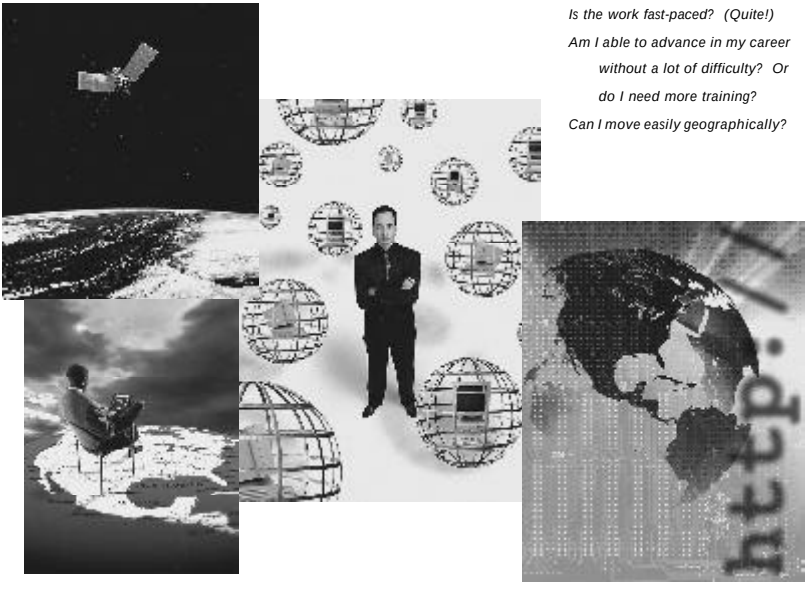
Do I work alone? In groups? Teams?

Are people skills important?

Is the work fast-paced? (Quite!)

Am I able to advance in my career without a lot of difficulty? Or do I need more training?

Can I move easily geographically?



Where do I sign on?!!

Hold on. First you've got to prepare yourself. Think about your own skills, knowledge, and abilities. Then think about the skills, knowledge, and abilities required for different jobs in Information Technology. (You'll be looking at these two combinations the rest of your work life.)

Let's start with abilities. The things you do well naturally. Do you enjoy gathering information to answer a question or solve a problem? Or do you enjoy working with, being around, and helping people? Or do you like making things work? Any answers? Take a look at the chart below. See if you can find some interesting possibilities among the many new job types developing within this rapidly growing and changing industry. Select a few. Go to the Internet and make it teach you everything you wanted to know about Information Technology (a great place to start is the Bureau of Labor Statistics Web site: www.bls.gov/ocohome.htm). Write down what you've learned and what you'd still like to know. Seek out two or three people who work in the occupation and get a first hand description of what their lives are like and how they got to where they are. And ask your guidance counselor how you can get involved in Job Shadowing and Mentoring programs.

Which Information Technology Jobs Would You Want?

Required Years of Training:	If You Like Working Primarily with ... Information?	People?	Things?
Less than 2 Years	• Central Office Operators • Secretaries	• Adjustment Clerks	• Data Entry Keyers • Fiber Optic Technicians • Peripheral Electronic Data Processing Equipment Operators • Scanner Operators • Typists Including Word Processors
2 Years	• Electronics Engineering Technicians • Sound Engineering Technicians • Computer Operators • Computer Network Technicians • Network Control Technicians • Telecommunications Technicians	• Computer Support Specialists	• Communication Equipment Mechanics, Installers & Repairers • Electronic Home Entertainment Equipment Repairers • Electronics Mechanics & Technicians • Electronic Pagination System Operators
4 or More Years	• Computer Aided Design Technicians • Computer Engineers • Computer & Information Systems Managers • Computer Programmers • Communications Managers • Multimedia Software Developers • Network Managers • Software Engineers • Systems Analysts • Technical Writers	*Note: All jobs require working with people. For most professional jobs, however, using information effectively and working with things are more important requirements of the jobs.*	• Graphics Designers

But I'm a genius. What more do you want. . . ?

Did you notice how few jobs there were in the preceding chart for people with little training?

Close to 50 percent of people in this industry have bachelor's degrees and another 20 percent have a master's or higher. While there's no doubt that our industry rewards genius more than most, knowledge, education, and training are what get you started. You'll have to know how things work, in an industry where "how things work" is changing every day. The more you know about how things have worked, the more you'll be comfortable within this change.

So where do I educate myself . . . other than at the computer arcade?

As the chart below shows, there are a lot of places to get general training and education in California.

The regional publication in this series shows the number of schools in your area that offer programs geared toward the Information Technology industry. The Educause Internet site below has direct links to about 400 California training providers in Information Technology. The Educause site and the Enhanced State Training Inventory site should give you all the detail you need.

California Schools

Type of School	*Number of Schools*
4-Year, College level & above	335
2-Year, Technical & Community Colleges	231
Private Business & Technical Schools, Public Adult Schools with Occupational Programs	1,728
Public Secondary, Job Training Partnership, Apprenticeship, Regional Occupational Programs, Other	386

For more information, visit these Web sites:

- *Enhanced State Training Inventory links to training programs throughout California* — ***www.soicc.ca.gov***
- *America's Career InfoNet links to a lot of state information including California Colleges and Universities* — ***www.acinet.org/acinet***
- *Educause Directory of Higher Education:* — ***www.educause.edu/ir/dheo.html***

So what do skills have to do with it?

Getting good (skilled) at what you're able to do makes you prized in the workplace.

Take your abilities and your knowledge and apply them to the job. That's skill development, something you'll be doing for the rest of your life. What kinds of skills are important to information technology jobs? The list below should give you something to think about. How would you combine your natural abilities with knowledge to get better and better at these skills?

Important Skills for EVERYONE in Information Technology: Effective communication is key.

Reading Comprehension	Understanding written sentences and paragraphs in work related documents
Active Listening	Listening to what other people are saying and asking questions that are appropriate
Speaking	Talking to others to convey information effectively

Important Skills for ENTRY LEVEL Jobs: Quality Control is key.

Service Orientation	Actively looking for ways to help people
Product Inspection	Inspecting and evaluating the quality of products
Testing	Conducting tests to determine whether equipment, software, or procedures are operating as expected
Operation Monitoring	Watching gauges, dials, or other indicators to make sure a machine is working properly

Important Skills for TECHNICAL Jobs: Effective investigation is key.

Troubleshooting	Determining what is causing an operating error and deciding what to do about it
Equipment Selection	Determining the kind of tools and equipment needed to do a job
Testing	Conducting tests to determine whether equipment, software, or procedures are operating as expected
Operation and Control	Controlling operations of equipment or systems
Information Gathering	Knowing how to find information and identifying essential information

Important Skills for PROFESSIONAL Jobs: Creative needs fulfillment is key.

Information Gathering	Knowing how to find information and identifying essential information
Writing	Communicating effectively with others in writing as indicated by the needs of the audience
Judgment and Decision Making	Weighing the relative costs and benefits of a potential action
Critical Thinking	Using logic and analysis to identify the strengths and weaknesses of different approaches
Information Organization	Finding ways to structure or classify multiple pieces of information
Active Learning	Working with new material or information to grasp its implications
Implementation Planning	Developing approaches for implementing an idea

Can I find a job easily? Will I be secure? Does it pay well?

If you've educated yourself well, yes to all three. If not, maybe yes, maybe no.

No other industry has higher average annual salaries across all major subgroups than Information Technology. Most are close to twice the state's average wage of $31,000 per year.

And that's not likely to change soon for a couple reasons:

- Education is a key to entering this field (unless you're an entrepreneur who is developing his/her own product and company) and that raises minimum salary levels. As the tables below and on page 4 show, there are few, traditional, lower paying, "entry level" jobs. High tech firms look for people with BA degrees (sometimes AA degrees) and then train people in their highly specialized and rapidly changing product lines.
- Demand for good employees is high. As the table below shows, employers find it hard to find qualified experienced and inexperienced workers for many jobs.

As the table below also shows, high demand prompts employers to offer strong benefits packages.
(See the California Trade and Commerce Agency Web site for some good data displays and Industry Profiles on Information Technology topics: www.commerce.ca.gov)

Wages, Benefits, & Demand for Selected Information Technology Jobs

California Jobs	*Median Hourly Wages*			*Benefits[1]*		*Demand[2]*	
	New Inexperienced	*New Experienced*	*3 Years with Firm*	*Full Time*	*Part Time*	*Experienced*	*Inexperienced*
Entry Level	*$*	*$*	*$*	*%*	*%*	*%*	*%*
Data Entry Keyers	7.50	9.00	10.36	65+	3+	44	39
Technical							
Computer Operators	13.00	13.00	14.00	90+	18+	50	45
Computer Network (Lan/Wan) Technicians	9.80	13.81	17.26	90+	5+	65	40
Computer Support Specialists	12.20	15.63	19.00	85+	3	70	72
Network Control Technicians	11.62	16.78	20.76	90+	10+	75	45
Telecommunications Technicians	10.40	15.00	20.00	80+	5+	90	90
Telephone & Cable T.V. Line Installers & Repairers	8.00	10.00	14.00	65+	0	62	30
Professional Level							
Computer Programmers, Including Aides	14.38	18.11	21.79	90+	5+	73	50
Computer Aided Design (CAD) Technicians	14.00	16.78	19.00	70+	0	80	44
Computer Engineers	14.38	19.18	23.97	90+	10+	78	62
Integrated Circuit Layout Designers	14.00	19.18	26.37	100	5+	75	28
Lan/Wan (Local/Wide Area) Network Managers	15.34	17.28	22.35	90+	5+	64	62
Multimedia Software Developers	12.34	17.63	23.97	45+	0	67	44
Software Engineers	19.18	23.97	31.16	90+	10+	93	57
Systems Analysts - Electronic Data Processing	13.90	17.05	21.57	85+	10	70	38
Telecommunications Engineers	16.78	20.71	26.37	90+	15	100	72
Webmasters & Web Site Designers & Developers	10.76	15.09	20.19	55+	0	60	28

1) Benefits: Percent of employers offering Medical, Dental, Sick Leave, and Vacation benefits.
2) Demand: Percent of employers saying they have a somewhat or very difficult time finding candidates.

So I ought to be able to find a job pretty easily, huh . . .

If you're looking in the right place. Most of the Information Technology jobs in California are concentrated in Southern California and the Silicon Valley, though Sacramento is growing rapidly as an Info Tech center. Check the regional publication in this series to find out how many employers there are in your area.

Here are a few ways to find out who's hiring:

- Use your local resources for leads. If you've been preparing yourself locally, then you probably already know who they are, through prior contacts. Visit these people and ask their advice. They'll normally be happy to help guide a potential future colleague.
- Check out the free industry directories and periodicals found on street corners and in libraries and bookstores to get the names, addresses, and phone numbers of potential employers.
- But most of all, explore **our** Internet. Start with the sites below for a great series of links that'll take you almost anywhere. Or do your own "key word" search if there's an aspect of this industry that you're specially interested in.

Plan well, and good fortune to you!

California Employers

Workplace	*Number of Employers*
Total Information Technology	16,747
Computer Programming	4,505
Prepackaged Software	1,537
Computer Systems Design	961
Computer Facilities Management	64
Computer Rental & Leasing	83
Other Computer Services	4,645
Computer & Data Processing	707
Information Retrieval	950
Telephone Communications	3,006
Telegraph & Other Non-Vocal Communications	81
Other Communications Services	208

For more information, visit these Web sites:

- *The California Occupational Information Coordinating Committee links to many resources:* ***www.soicc.ca.gov***
- *The Employment Development Department links to STC, CalJOBS and America's Job Bank:* ***www.edd.ca.gov***
- *California State Personnel Board links to various government job sites:* ***www.spb.ca.gov/jobs.htm***
- *The California Trade and Commerce Agency Industry Background:* ***www.commerce.ca.gov/california/economy/profiles***

About the Data: Industries in this and other Career Opportunities publications reflect the California Department of Education's selection of Standard Industrial Classifications that would provide the best overall picture of an industry to students, guidance counselors, and parents. Some classifications have been assigned to more than one "industry group" because the classifications have direct relevance to more than one "industry."

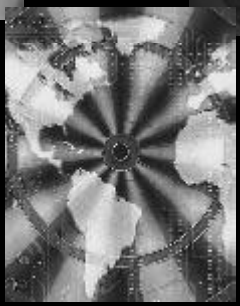
Data are drawn from:

- *Workplace Size and Expected Growth* (page 2) and *California Employers* (page 8): the Employment Development Department (EDD) Labor Market Information Division (LMID) Covered Employment and Wages Program (ES 202). Counts and percentages are from the 3^{d} Quarter of 1997. Projections of Growth are from 1995 ES 202 Data. Percentages may not add to 100 due to rounding.

- *Which Information Technology Jobs Would You Want* (page 4) and the information regarding skills: Dictionary of Occupational Titles (DOT), Occupational Information Network (O*NET), and the Department of Labor.

- *California Schools* (page 5): the 1998 Enhanced State Training Inventory. Counts are approximate and include multiple sites of the same provider.

- *Wages, Benefits, and Demand for Selected Information Technology Jobs* (page 8): EDD LMID California Cooperative Occupational Information System (CCOIS) Occupational Summaries, 1995-1997. Wages for jobs having union and non-union employees are reported for whichever of the two show higher wage levels. In many cases, however, the differences between union and non-union wages are small. Wages reflect periods having different minimum wages. A median wage is the middle point in a range of wages.



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